

WHAT IS CLAIMED IS:

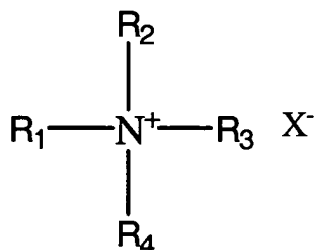
1. A method of preparing a rubber polymer in the absence of carbon black, silica, silica
5 treated carbon black or mixtures thereof, comprising;

combining an organoclay with a rubber polymer to form an organoclay-rubber
composition; and

10 curing the organoclay-rubber composition, wherein the organoclay-rubber composition is
substantially free of carbon black, silica, silica-treated carbon black or mixtures thereof.
2. The method of claim 1, wherein the rubber polymer is nitrile rubber.
- 15 3. The method of claim 1, wherein the organoclay intercalates with the rubber polymer.
4. The method of claim 1, wherein the organoclay comprises montmorillonite.
5. The method of claim 1, wherein the organoclay comprises hectorite, saponite, attapulgite,
20 beidellite, stevensite, sauconite, nontronite, Laponite, sepiolite or combinations thereof.
6. The method of claim 1, wherein combining the organoclay with the rubber polymer
comprises adding an amount of organoclay ranging from about 1 pphr to about 100 pphr to the
rubber polymer.
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7. The method of claim 1, wherein the organoclay comprises an onium compound.

8. The method of claim 1, wherein the organoclay comprises one or more quaternary ammonium compounds.

9. The method of claim 1, wherein the organoclay comprises one or more quaternary ammonium compounds of the general formula:



wherein R_1 , R_2 , R_3 , and R_4 represent alkyl groups having an average carbon atom number ranging from 1 to 30, aryl groups having an average carbon atom number ranging from 7 to 22; arylalkyl groups having an average carbon atom number ranging from 7 to 22, or combinations thereof; and wherein X represents a halogen, a nitrite, a nitrate, a sulfate, a methyl sulfate, a hydroxide, a halogenated methyl compound or a C_1 to C_{18} carboxylate.

10. The method of claim 1, wherein the organoclay comprises a multi-charged onium ion.

11. The method of claim 1, further comprising combining an activator with the organoclay-rubber composition.

12. The method of claim 1, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises stearic acid, palmitic acid, linoleic acid or combinations thereof.

13. The method of claim 1, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises zinc.

14. The method of claim 1, further comprising combining an activator with the organoclay-rubber composition, wherein the activator is zinc stearate.

5 15. The method of claim 1, further comprising combining an accelerator with the organoclay-rubber composition.

16. The method of claim 1, further comprising combining an accelerator with the organoclay-rubber composition, wherein the accelerator is mercaptobenzothiazole disulfide.

10 17. The method of claim 1, further comprising combining a vulcanizate with the organoclay-rubber composition.

18. The method of claim 1, further comprising combining a vulcanizate with the organoclay-
15 rubber composition, wherein the vulcanizate is sulfur.

19. The method of claim 1, further comprising combining a vulcanizate with the organoclay-rubber composition, wherein the vulcanizate comprises one or more peroxide compounds.

20 20. The method of claim 1, further comprising combining an activator, an accelerator, a vulcanizate or combinations thereof with the organoclay-rubber composition.

21. The method of claim 1, wherein the rubber compound exhibits a modulus of greater than 1800 psi at an elongation percent of about 300.

25 22. The method of claim 1, wherein the rubber compound exhibits a tensile strength of greater than 1000 psi and a modulus greater than 1800 psi at an elongation percent of about 300.

23. The method of claim 1, wherein combining the clay with the rubber polymer occurs at a temperature less than 200 °C.

24. A method of preparing a rubber compound in the absence of carbon black, silica, silica
5 treated carbon black or mixtures thereof, comprising:

combining a clay with a rubber polymer to form a clay-rubber composition; and

combining the clay-rubber composition with an onium ion to form an organoclay-rubber
10 composition; and

curing the organoclay-rubber composition, wherein the organoclay-rubber composition is substantially free of carbon black, silica, silica-treated carbon black or mixtures thereof.

15 25. The method of claim 24, wherein the rubber polymer is nitrile rubber.

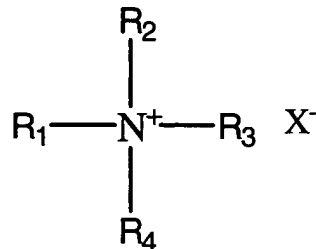
26. The method of claim 24, wherein the clay comprises montmorillonite.

27. The method of claim 24, wherein the clay comprises hectorite, saponite, attapulgite,
20 beidellite, stevensite, sauconite, nontronite, Laponite, sepiolite or combinations thereof.

28. The method of claim 24, wherein combining the clay with the rubber polymer comprises adding an amount of clay ranging from about 1 pphr to about 100 pphr to the rubber polymer.

25 29. The method of claim 24, wherein the onium compound comprises one or more quaternary ammonium compounds.

30. The method of claim 24, wherein the onium compound comprises one or more quaternary ammonium compounds of the general formula:



5 wherein R₁, R₂, R₃, and R₄ represent alkyl groups having an average carbon atom number ranging from 1 to 30, aryl groups having an average carbon atom number ranging from 7 to 22; arylalkyl groups having an average carbon atom number ranging from 7 to 22, or combinations thereof; and wherein X represents a halogen, a nitrite, a nitrate, a sulfate, a
10 methyl sulfate, a hydroxide, a halogenated methyl compound or a C₁ to C₁₈ carboxylate.

31. The method of claim 24, wherein the onium compound comprises a multi-charged onium ion.

15 32. The method of claim 24, further comprising combining an activator with the organoclay-rubber composition.

33. The method of claim 24, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises stearic acid, palmitic acid, linoleic acid or
20 combinations thereof.

34. The method of claim 24, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises zinc.

35. The method of claim 24, further comprising combining an activator with the organoclay-rubber composition, wherein the activator is zinc stearate.

36. The method of claim 24, further comprising combining an accelerator with the organoclay-rubber composition.

37. The method of claim 24, further comprising combining an accelerator with the organoclay-rubber composition, wherein the accelerator is mercaptobenzothiazole disulfide.

38. The method of claim 24, further comprising combining a vulcanizate with the organoclay-rubber composition.

39. The method of claim 24, further comprising combining a vulcanizate with the organoclay-rubber composition, wherein the vulcanizate is sulfur.

40. The method of claim 24, further comprising combining a vulcanizate with the organoclay-rubber composition, wherein the vulcanizate comprises one or more peroxide compounds.

41. The method of claim 24, further comprising combining an activator, an accelerator, a vulcanizate or combinations thereof with the organoclay-rubber composition.

42. The method of claim 24, wherein combining the clay with the rubber polymer occurs at a temperature less than 200 °C.

43. A rubber compound substantially free of carbon black, silica, silica treated carbon black or mixtures thereof made by the process, comprising:

combining an organoclay with a rubber polymer to form a clay-rubber composition; and

curing the organoclay-nitrile composition, wherein the organoclay-rubber composition is substantially free of carbon black, silica, silica-treated carbon black or mixtures thereof.

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44. The rubber compound of claim 43, wherein the rubber polymer is nitrile rubber.

45. The rubber compound of claim 43, wherein the clay comprises montmorillonite.

10 46. The rubber compound of claim 43, wherein the clay comprises hectorite, saponite, attapulgite, beidellite, stevensite, sauconite, nontronite, Laponite, sepiolite or combinations thereof.

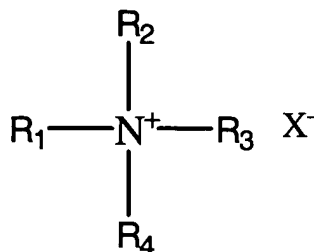
15 47. The rubber compound of claim 43, wherein combining the organoclay with the rubber polymer comprises adding an amount of organoclay ranging from about 1 pphr to about 100 pphr to the rubber polymer.

48. The rubber compound of claim 43, wherein the organoclay comprises one or more onium compounds.

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49. The rubber compound of claim 43, wherein at least one onium compound comprises one or more quaternary ammonium compounds.

25 50. The rubber compound of claim 43, wherein the organoclay comprises one or more quaternary ammonium compounds of the general formula:



wherein R₁, R₂, R₃, and R₄ represent alkyl groups having an average carbon atom number ranging from 1 to 30, aryl groups having an average carbon atom number ranging from 7 to 22; arylalkyl groups having an average carbon atom number ranging from 7 to 22, or combinations thereof; and wherein X represents a halogen, a nitrite, a nitrate, a sulfate, a methyl sulfate, a hydroxide, a halogenated methyl compound or a C₁ to C₁₈ carboxylate.

51. The rubber compound of claim 43, wherein the organoclay comprises a multi-charged onium ion.

52. The rubber compound of claim 43, further comprising combining an activator with the organoclay-rubber composition.

53. The rubber compound of claim 43, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises stearic acid, palmitic acid, linoleic acid or combinations thereof.

54. The rubber compound of claim 43, further comprising combining an activator with the organoclay-rubber composition, wherein the activator comprises zinc.

55. The rubber compound of claim 43, further comprising combining an activator with the organoclay-rubber composition, wherein the activator is zinc stearate.

56. The rubber compound of claim 43, further comprising combining an accelerator with the organoclay-rubber composition.

57. The rubber compound of claim 43, further comprising combining an accelerator, wherein
5 the accelerator is mercaptobenzothiazole disulfide.

58. The rubber compound of claim 43, further comprising combining a vulcanizate with the organoclay-rubber composition.

59. The rubber compound of claim 43, further comprising combining an accelerator with the organoclay-rubber composition, wherein the accelerator is mercaptobenzothiazole disulfide.

60. The rubber compound of claim 43, further comprising combining a vulcanizate with the organoclay-rubber composition, wherein the vulcanizate is sulfur.

61. The rubber compound of claim 43, further comprising combining an activator, an accelerator, a vulcanizate or combinations thereof with the organoclay-rubber composition.

62. The rubber compound of claim 43, wherein the rubber compound exhibits a modulus of
20 greater than 1800 psi at an elongation percent of about 300.

63. The rubber compound of claim 43, wherein the rubber compound exhibits a tensile strength of greater than 1000 psi and a modulus greater than 1800 psi at an elongation percent of about 300.

64. The rubber compound of claim 43, wherein combining the clay with the rubber polymer occurs at a temperature less than 200 °C.